GE ENERGY
GE MAIN PLANT
SCHENECTADY, NEW YORK

REVISED FEASIBILITY STUDY REPORT

MAY 2004

Prepared For:
GE Energy
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URS

May 27, 2004

Mr. Damian Foti
General Electric Energy
One River Road
Building 43, Room 237
Schenectady, New York 12345

RE: *Revised Feasibility Study*
General Electric Energy – Main Plant
Schenectady, New York

Dear Damian:

We have attached the *Revised Feasibility Study* for the General Electric Energy Main Plant Facility in Schenectady, New York. URS Corporation has prepared this document in general accordance with the regulations for the New York State Inactive Hazardous Waste Disposal Site Remedial Program (6 NYCRR Part 375) and Order on Consent #A4 0336-95-09. This *Revised Feasibility Study* reflects revisions made in response to New York State Department of Environmental Conservation's (NYSDEC's) comments of October 18, 2002, on the January 31, 2002 *Feasibility Study* for Main Plant and revisions made in response to NYSDEC's comments of April 8, 2004, on the May 30, 2003 *Revised Feasibility Study*.

Please call us if you have any questions or comments on this report.

Very truly yours,
URS CORPORATION – NEW YORK

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3.5 PREVIOUS ENVIRONMENTAL STUDIES

Over the past 20 years, GE and others have conducted numerous and extensive investigations to evaluate environmental conditions at the site. The RI process generated numerous work plans and investigative reports, which were submitted to the NYSDEC for their review in accordance with the Order. These documents include, but are not limited to:

- *Sector Reports* (Twenty One Individual Reports)
- *Area of Concern Report*, Dames & Moore, dated January 14, 1997
- *Sampling and Analysis Report – Groundwater Sampling Program December 1997*, Dames & Moore, dated March 4, 1998
- *Summary Report, City of Schenectady Water Main Investigation*, Dames & Moore, dated June 10, 1998
- *Sampling Report, Mohawk River Sampling*, Dames & Moore, dated August 10, 1998
- *Seep Evaluation Report –GE Main Plant – Schenectady*, New York, Dames & Moore, dated October 30, 1998
- *Sampling and Analysis Report – Groundwater Sampling Program October 1998*, Dames & Moore, dated December 8, 1998
- *Revised Remedial Investigation/Feasibility Study Work Plan, GE – Main Plant Facility, Schenectady, New York*, Dames & Moore, dated January 21, 1999
- *Zone 2 Area of Concern Report, GE – Main Plant*, Dames & Moore, dated March 23, 2000
- *Zone 1 Remedial Investigation Report*, Dames & Moore, dated April 25, 2000
- *Zone 1 Phase 2 Remedial Investigation Workplan*, URS Corporation, dated June 30, 2000
- *Zone 2 Remedial Investigation Workplan*, URS Corporation, dated June 30, 2000
- *Remedial Investigation Report*, URS Corporation, dated October 19, 2001
- *Feasibility Study Report*, URS Corporation, dated January 31, 2002
- *Revised Remedial Investigation Report*, URS Corporation, dated May 30, 2003
- *Revised Feasibility Study Report*, URS Corporation, dated May 30, 2003

The results of the previous investigations, conducted at the site prior to the Order have been summarized in Section 2.4 of the *RI Report*. The documents used to prepare this *Revised Feasibility Study* are listed in Section 9.0 of this document.

The body of investigative work that has been completed at the Main Plant has developed a comprehensive database from sampling and analysis activities across the site that adequately characterizes the nature and extent of hazardous waste contamination at the site in order to support the evaluation of potential remedial alternatives in the Feasibility Study. As part of the RI, risk assessments were performed to evaluate potential risks to human health and ecological receptors based on the site conditions. The remainder of this section discusses the results of the human health and ecological risk assessments that have been performed at the Main Plant.

3.5.1 Human Health Risk

In 1999, GE performed a Human Health Risk Assessment (HHRA) to evaluate potential risks to human health under current and reasonably foreseeable future conditions. The risk assessment was performed in accordance with USEPA guidance document, entitled *Risk Assessment*

Guidance for Superfund Volume I Human Health Evaluation Manual (Part A) USEPA, dated 1989, and, where appropriate, other USEPA and state guidance documents. The results of the HHRA were presented in the April 25, 2000 *Zone I Remedial Investigation Report*. This section summarizes the results of the HHRA.

Exposure scenarios were described, exposure concentrations and doses were calculated, and risks were quantified for:

- Current and future residents that live in the residential area northwest of the Main Plant;
- Potential current or future users of the Mohawk River as a source of drinking water;
- Current and future employees working at the property;
- Potential older children trespassing on the undeveloped former landfill portions of the property;
- Potential future workers who may perform subsurface excavation work during future construction or utility maintenance on the developed portion of the property; and
- Potential future children and adults using the former landfill portions of the site for recreation.

The primary concern for area residents is the potential use of groundwater as a drinking water source. Based on the hydrogeological data, and several years of analytical data, the groundwater beneath GE's Main Plant does not flow toward the Town of Rotterdam well field. Thus, groundwater conditions beneath Main Plant do not impact residents using this well field as a source of potable water.

To date, no chemicals of concern have been detected in the water in the Mohawk River. As part of the HHRA, conservative assumptions were used to estimate potential future concentrations of VOCs (primarily vinyl chloride) in the Mohawk River. The concentrations were determined to be well below drinking water standards. The estimated concentrations of VOCs were less than one tenth of their maximum contaminant levels (MCLs). Thus, based on this analysis, conditions at the site do not affect the suitability of the Mohawk River as a drinking water supply. Additionally, because of the turbidity of the water in the Mohawk River and its current use as a barge canal, there is no basis to anticipate that the river near the site will become a direct source of potable water.

The primary potential exposure pathway for employees is the inhalation of VOCs that could migrate into the indoor air. This potential pathway was evaluated using a conservative groundwater to air transfer model. The results show that conditions at the site do not pose a significant risk of non-carcinogenic or carcinogenic health effects to GE's employees. The total hazard index is less than one for employees working in all parts of the plant. A total hazard index equal to or less than one was considered acceptable based on USEPA guidance. The total incremental lifetime carcinogenic risk ranges between 1.45×10^{-6} and 2.88×10^{-6}. The USEPA has established an acceptable risk range between 1×10^{-4} and 1×10^{-6}. The acceptable incremental lifetime carcinogenic risk limit used in this risk assessment was 1×10^{-5}. In summary, there are no significant risks to employees.

The primary potential exposure pathways for trespassers include ingestion of surface soil, skin contact with soil, inhalation of particulate matter, ingestion of sediment, skin contact with sediment, or skin contact with the surface water in the Poentic Kill and the seeps. The total chronic hazard index is 0.08. The total incremental lifetime carcinogenic risk is 9.17×10^{-7}. Thus, the conditions at the site do not pose a significant risk of carcinogenic or non-carcinogenic health effects to trespassers. In summary, there are no significant risks to trespassers.

Under reasonably foreseeable future conditions, construction workers may be exposed to soil during excavation projects via incidental ingestion and dermal contact with soil and the inhalation of particulates. The total chronic hazard index of 0.271 is within acceptable limits and the incremental lifetime carcinogenic risk of 9.42×10^{-7} is also within acceptable limits. Thus, the site does not pose an unacceptable risk to construction workers who may be involved in either grading or excavation on the developed portion of the site.

Under reasonably foreseeable future conditions, adults and children could use the site for recreation. If so, they could only be exposed to the chemicals of concern detected in surface soil in the former landfill areas, sediment in the Poentic Kill and the Poenties Kill, and the surface water in the Poentic Kill. The average daily exposure doses were calculated for ingestion of soil, skin contact with soil, inhalation of particulate matter, ingestion of sediment, skin contact with sediment, and skin contact with surface water in the Poentic Kill. The total hazard index for young children is 0.2 and for older children is 0.05. The total time-weighted incremental lifetime carcinogenic risk is 2.52×10^{-6}. Thus, the conditions at the site do not pose a significant risk of non-carcinogenic or carcinogenic health effects to people who choose to use the site for recreational purposes in the future.

In summary, based on the assumptions used to calculate human health risks in the screening level risk assessment, GE's Main Plant site does not pose a significant risk of non-carcinogenic health effects to employees, trespassers, residents, construction workers or people who may use the site for recreation. The incremental lifetime carcinogenic health risks are also less than the acceptable risk limit.

3.5.2 Ecological Risk

This section summarizes the results of a screening level ecological risk assessment (SLERA) for the former landfill areas at Main Plant. The SLERA, which was originally submitted to the NYSDEC as part of the April 25, 2000 *Zone 1 Remedial Investigation Report,* was revised in accordance with comments provided by the NYSDEC. The revised SLERA is included in Appendix H of the 2003 *RI Report.*

The SLERA used available site data that had been collected through early 2000 to evaluate exposure, to evaluate potential toxicity of chemicals in on-site media, and to estimate the risk of adverse impacts to ecological receptors. The overall objectives of the ecological risk assessment process were: 1) to determine if plants or animals have been adversely affected at or near the site by chemical contamination resulting from past activities; and 2) to characterize the type, magnitude, and extent of potential or existing risks to ecological resources. Even though the Main Plant is not a Superfund Site, the SLERA document follows USEPA guidance that was

developed for Superfund Sites (ERAGS; U.S. EPA 1997a), including Steps 1 and 2 of the eight step risk assessment process.

Step 1: Screening-Level Problem Formulation and Ecological Effects Evaluation

The SLERA focused on the former landfill areas, which contains the Poentic Kill drainage (Poentic and Poenties Kills) and the upland habitats in adjacent areas. Ecological receptors are not expected to be adversely affected by chemical concentrations occurring in other portions of the site, since ecological habitat or surface contamination is absent.

In the SLERA, receptors of concern (ROCs) represent species in most of the major consumer trophic levels. They include:

- Terrestrial Vegetation – Considered as a group
- Soil Invertebrates – Considered as a group
- Song Birds – Robin
- Carnivorous Birds -- Red-Tailed Hawk
- Small Mammals – Deer Mouse and Short-Tailed Shrew
- Mammals-Herbivores – Eastern Cottontail
- Wetland Plants – Considered as a group
- Benthic Invertebrates – Considered as a group
- Fish Community – Considered as a group
- Amphibians – Considered as a group
- Waterfowl – Mallard Duck
- Piscivorous Birds – Belted Kingfisher
- Semi-aquatic Mammals – Mink

The initial chemicals of potential concern (COPCs) selection process commenced with a review of all historical data collected through early 2000 during the RI, as well as other data collected at the site. The chemical data for surface soils, surface water, groundwater seeps and sediments were reviewed and compared to New York State screening criteria for surface water, sediment and soil to identify COPCs for each media. The COPC selection process was based on the following conservative comparison criteria:

- Constituents of which the maximum detected concentrations are above screening values are considered COPCs.
- Detected constituents with no New York State screening criteria are considered COPCs.
- Undetected constituents with detection limits above screening values are considered COPCs.
- Undetected constituents with no New York State screening criteria are not considered COPCs.

The following complete exposure pathways were identified for the site, based on the ROCs and preliminary COPC screening for surface water, groundwater seeps, surface soil, and sediment.

ECOLOGICAL RECEPTOR EXPOSURE PATHWAYS TO BE EVALUATED

Exposure pathway	Receptor
Dermal contact with soils	Terrestrial biota
(Incidental) ingestion of soils	Terrestrial biota
Dermal contact with surface water, pore water, or sediment	Aquatic biota
(Incidental) ingestion of sediment	Aquatic biota
Ingestion of water	Terrestrial biota
Ingestion of prey	Terrestrial and aquatic biota

The assessment endpoints and measures of effect provide the foundation for Step 2, Screening-Level Exposure Estimate and Risk Calculation.

The assessment endpoints include:

1) Levels of COPC in the soils, sediments and surface waters on or near Main Plant which pose the potential for harm to populations of plants and biota living in the soil, sediment or surface water.

2) Levels of COPC in plant and animal tissues living on or utilizing Main Plant which pose the potential for adverse effects to individual wildlife predators feeding on them.

The measures of effect include:

1) Comparison of soil, sediment or surface water COPC concentrations to chronic standards for biota in sediment or surface water. Exceedance of these standards indicates that there is some potential for adverse effects to some portion of the population living in the soil, sediment or surface water.

2) Comparison of measurements or estimates of COPC body burdens in plants or animals to population level (e.g., reproductive impairment) toxicological reference values for wildlife predators derived from the literature. The amount by which the calculated intake, on average, by wildlife predators exceeds toxicological reference values is a measure of potential impact to populations of wildlife predators feeding on Main Plant aquatic biota.

Step 2: Screening-Level Exposure Estimate and Risk Characterization

Based on the exposure estimate and risk characterization, the SLERA concluded that a thorough baseline risk assessment is warranted, and additional sampling should be proposed during the baseline problem formulation (Step 3 of the ERAGS process). This conclusion represents the first Scientific Management Decision Point (SMDP) for a SLERA. Results of the SLERA indicate the presence of vigorous and diverse plant communities suggesting that effects from COPCs are minimal and site flora should not be considered a ROC in further Site assessments. The initial results of the SLERA for fauna are viewed with high uncertainty, with hazard quotients (HQs) > 1, indicating a potential for adverse effects. However, the available data is insufficient to fully characterize the risks that select COPCs may pose to fauna ROCs. The data

used in the SLERA did not account at all for the many site-specific factors that may limit bioavailability and toxicity.

The recommendations for further data collection, which were developed in the SLERA, are shown below. The more recent investigation (July 2000 through April 2001), included collection and analysis of samples to address the first three questions listed below. The data is included in the 2003 *RI Report*, but was not incorporated into the SLERA.

RECOMMENDATIONS FOR FURTHER DATA COLLECTION

Question to Address	Data Required
Eliminate uncertainties in spatial distribution of COPCs in former landfill area media.	Additional collection of soil, sediment and surface water samples.
Eliminate uncertainties surrounding COPCs bioavailability and distribution in former landfill area media.	Additional analysis of those characteristics (AVS/SEM, TOC and grain size) that affect bioavailability of COPCs in soil and sediment. Filtered samples for dissolved metals analysis for surface water.
Assess body burdens of COPCs in prey organisms to reduce uncertainties inherent in food web modeling.	Biota collection for analysis of tissue residue of some bioaccumulative COPCs.
Eliminate uncertainties associated with multiple effects of COPCs on invertebrates in landfill area soil and sediment.	Focused laboratory toxicity testing.